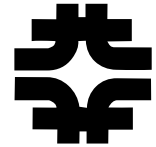
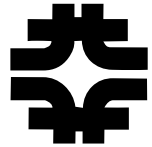


Physics and Experimental Program Overview

Hugh Montgomery
Fermilab
March 16, 2004

Associate Director for Research



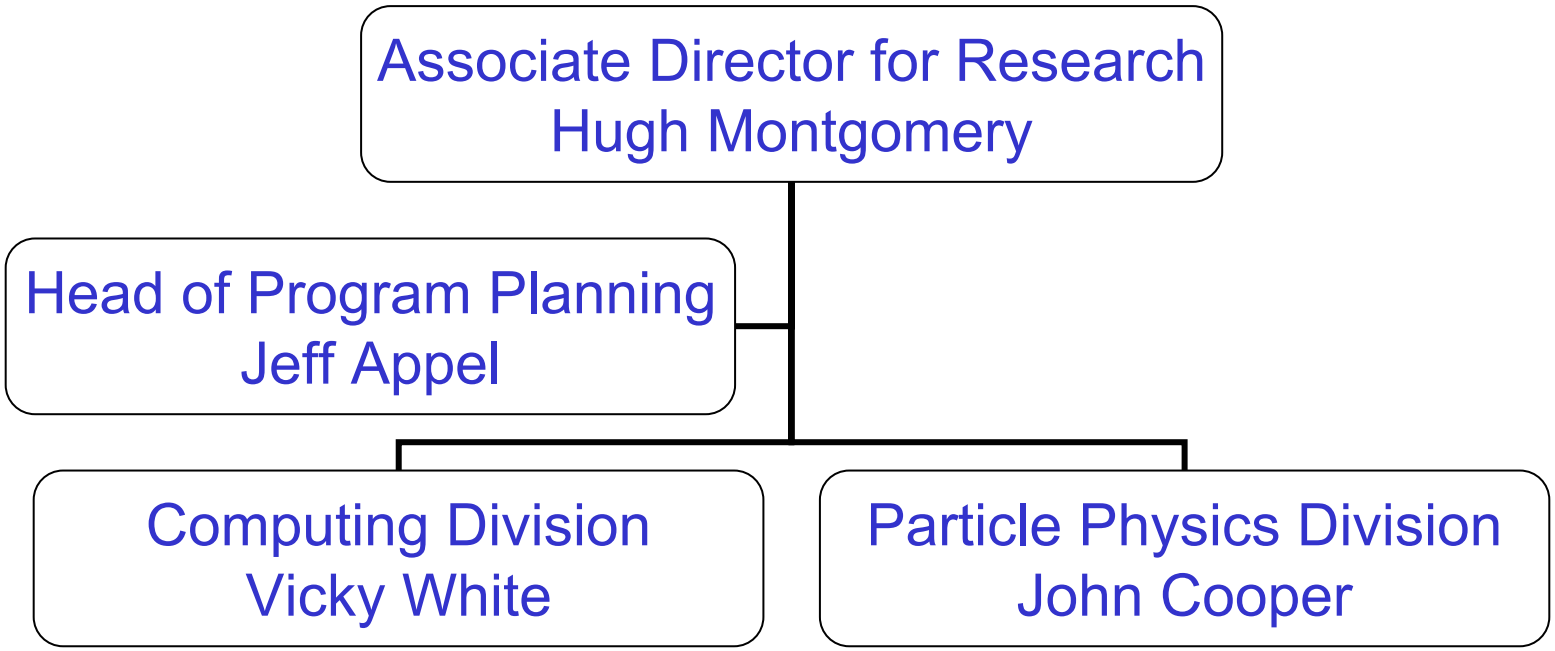
- **Research Program**
  - particle physics which seeks to understand what are the fundamental components of our universe and how they interact
    - complex of accelerators at Fermilab
    - accelerators elsewhere, LHC
    - examining cosmic radiation; there are examples in which we use optical telescopes, charged particle detection, x-ray detection, and one in which we search for weakly interacting massive particle radiation
  - theoretical physics
    - particle physics
    - Cosmology
- **Program Planning**
- **Particle Physics Division**
- **Computing Division**

Programs

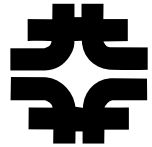
- FNAL Accel. Programs
  - Collider-Run II (CDF/D0) → BTeV
  - Neutrinos
    - NuMI/Minos
    - → {NuMI OffAxis}
    - MiniBooNE → {mini(BooNE}
  - MI-based Fixed Target
    - Test Beam
    - QCD, → {QCD, (Kaon) Expts}
- LHC
- Theory
  - Particle
  - Astroparticle
- Astroparticle Expts
- Linear Collider Detector R&D
- Computing

Fermilab Site

Line Management



The Divisions



- Particle Physics Division
  - Designs, Constructs, Installs, Operates and Maintains experiments
    - CDF, D0, MINOS, LHC, …
  - Theory and Theoretical Astrophysics
  - 491 staff
- Computing Division
  - Designs, Constructs, Installs, Operates and Maintains data acquisition and offline computing systems for experiments
    - CDF, D0, MINOS, LHC, …
  - Experimental Astrophysics Group
  - 258 staff

PPD FY04 BUDGET

Table 1: FY04 budget by major activities			
DS - PARTICLE PHYSICS DIVISION	Labor	M&S	Total
Run 2			
Accelerator Operation	0.0	0.0	0.0
Accelerator Improvement	4,077.7	0.0	4,077.7
Detector Operation	7,171.8	2,727.0	9,898.8
Detector Improvement	3,261.1	1,914.0	5,175.1
Non-Run 2			
Accelerator Operation	740.1	10.0	750.1
Accelerator Improvement	0.0	0.0	0.0
Detector Operation	1,461.1	1,710.0	3,171.1
Detector Improvement	1,244.0	574.0	1,818.0
Others			
LHC	3,798.0	5,156.2	8,954.2
Non-accelerator physics	1,675.7	1,015.0	2,690.7
Theory	4,555.0	470.0	5,025.0
Physics Research	6,556.1	542.0	7,098.1
NuMI Line Item	666.0		666.0
Future Accelerator R&D	720.7	120.0	840.7
Future Detector R&D	4,610.0	1,030.0	5,640.0
Direct	5,599.4	2,383.0	7,982.4
Indirect	0.0	0.0	0.0
Total	46,136.7	17,651.2	63,787.9

CD FY04 BUDGET

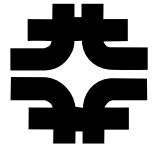
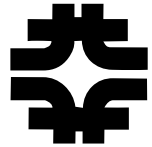


Table 1: FY04 budget by major activities			
DS - COMPUTING DIVISION	Labor	M&S	Total
Run 2			
Accelerator Operation	0.0	0.0	0.0
Accelerator Improvement	1,528.2	12.3	1,540.5
Detector Operation	5,771.2	4,195.5	9,966.7
Detector Improvement	0.0	0.0	0.0
Non-Run 2			
Accelerator Operation	0.0	0.0	0.0
Accelerator Improvement	0.0	0.0	0.0
Detector Operation	834.9	143.5	978.4
Detector Improvement	0.0	36.8	36.8
Others			
LHC	2,577.8	1,801.0	4,378.8
Non-accelerator physics	1,411.2	276.0	1,687.2
Theory	534.0	570.8	1,104.8
Physics Research	205.0	49.7	254.7
NuMI Line Item	0.0	0.0	0.0
Future Accelerator R&D	132.2	7.2	139.4
Future Detector R&D	386.6	61.5	448.1
Direct	12,840.7	6,086.2	18,926.8
Indirect	996.2	0.0	996.2
Total	27,217.9	13,240.4	40,458.3

PPD Budget – FY2004 Total

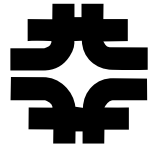


Laboratory WBS Structure Total

Division/Section: DS - PARTICLE PHYSICS DIVISION

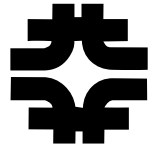
DIRECT COSTS ONLY		FY04 BASE	FY04 TOTAL	Operating	R&D	Equipment
1.1	Accelerators	4,077.7	4,077.7	4,077.7	0.0	0.0
1.2	Collider Experimental Program	21,691.9	21,691.9	11,129.9	6,618.0	3,944.0
1.3	LHC	2,353.0	8,954.2	2,353.0	0.0	0.0
1.4	BTeV	4,393.1	4,393.1	0.0	4,393.1	0.0
1.5	Experimental Initiatives	2,237.0	2,307.0	510.0	1,727.0	0.0
1.6	Neutrino Experiments	5,825.2	5,825.2	3,341.2	0.0	1,818.0
1.7	Future Accel. & Advanced Accel. R&D	840.7	840.7	0.0	840.7	0.0
1.8	Theory	4,815.0	5,025.0	0.0	4,815.0	0.0
1.9	Experimental Particle Astrophysics	2,072.7	2,690.7	2,022.7	0.0	50.0
1.10	Programmatic Support (Direct)	3,493.2	3,533.8	3,314.3	178.9	0.0
1.12	Other Support (Direct)	1,359.3	1,359.3	1,359.3	0.0	0.0
1.13	Division Management and Support (Direct)	2,944.3	2,944.3	2,944.3	0.0	0.0
1.14	Indirect Support	0.0	0.0	0.0	0.0	0.0
1.0	TOTAL	56,103.1	63,787.9	31,052.4	18,572.7	5,812.0

CD Budget – FY2004 -- Total



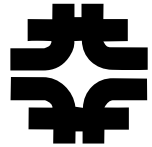
Division/Section: DIRECT COSTS ONLY	DS - COMPUTING DIVISION	FY04 BASE	FY04 TOTAL	Operating	R&D	Equipment
1.1	Accelerators	1,540.5	1,540.5	1,540.5	0.0	0.0
1.2	Collider Experimental Program	9,966.7	9,966.7	7,081.7	0.0	2,885.0
1.3	LHC	335.8	4,378.8	335.8	0.0	0.0
1.4	BTeV	401.1	401.1	369.1	0.0	32.0
1.5	Experimental Initiatives	301.7	301.7	301.7	0.0	0.0
1.6	Neutrino Experiments	1,015.2	1,015.2	978.4	0.0	36.8
1.7	Future Accel. & Advanced Accel. R&D	0.0	139.4	0.0	0.0	0.0
1.8	Theory	611.9	1,104.8	368.9	0.0	243.0
1.9	Experimental Particle Astrophysics	1,687.2	1,687.2	1,553.2	0.0	134.0
1.10	Programmatic Support (Direct)	12,671.3	13,911.2	11,203.3	860.0	608.0
1.12	Other Support (Direct)	1,231.0	1,231.0	1,231.0	0.0	0.0
1.13	Division Management and Support (Direct)	3,784.7	3,784.7	3,705.7	0.0	79.0
1.14	Indirect Support	996.2	996.2	996.2	0.0	0.0
1.0	TOTAL	34,543.2	40,458.3	29,665.4	860.0	4,017.8

Challenges/Risks



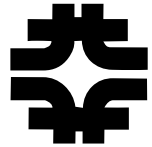
- Collider Detectors longevity
  - Increasing luminosity
    - Triggers (upgrade in train)
    - Data and data handling (upgrades planned)
  - Unanticipated Accel. Losses (Beam Loss Aborts)
  - Attrition (Regular maintenance)
  - Aging (management decision)
- Infrastructure Adequacy
  - Feynman Computing Center limitations/mitigation plan in place
- Transitions
  - MINOS to operations (Detector team plans operations)
  - BTEV R&D to project (project staffing, planning)
  - BTeV R&D to construction (project staffing, planning)

Inter-Divisional Coordination



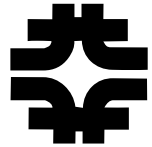
- Scientific and All-Directors' Meetings
  - weekly, monthly
- Directors' Meetings: individual Division Heads
  - ~ monthly
- Director's Meetings: all Division Heads
  - ~monthly
- Assoc. Dir. Meetings: individ. Division Heads
  - weekly
- Assoc. Dir. Meetings: both Division Heads
  - weekly
- Budget Reviews, all Division and Section Heads
  - annually

Program Planning



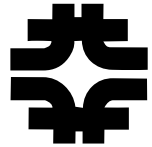
- Assistant Director: Jeff Appel
  - Coordination of Accelerator/Experimental Program
    - Arbitration
  - All Experimenters' Meeting
  - Liaision with experiments in early stages, Expressions of Interest, Letters of Intent, Proposals
  - Oversight of Test Beam Program

Oversight



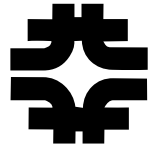
- Collider Detector Upgrades
  - CDF Run IIB Upgrade Project Management Grp
  - D0 Run IIB Upgrade Project Management Grp
  - NuMI/MINOS Project Management
- CMS
  - CMS Construction Project PMG
  - CMS Computing and Software PMG
- Neutrinos
  - NuMI Project PMG

(CDF) Program Management Group



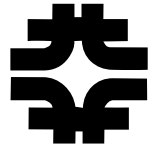
- PMG Membership (Can vary from Project to Project)
  - Chair from Directorate
  - BSS Head or Representative
  - PPD Head or Representative
  - CD Head or Representative
  - Project Manager
  - Dep Proj. Manager
  - Financial Manager
  - Schedule Manager
  - Subproject Managers
  - Others as needed by Agenda
- Other Attendees
  - D0 Project Manager
  - CDF Spokespersons
  - Director
  - Deputy Director
  - Head, Construction Support
  - Head, Program Planning

Meetings with Experiments



- All Experimenters' Meeting
  - Open
  - Directors
  - Divisions
  - Experimenters
  - FAO
- Run II PMG
  - AD
  - Directors
  - Other Divisions
  - Experiments
  - Fermi Area Office
- Special Meetings:
  - Directors+ with Spokespersons
- Ad Hoc Availability
  - Spokes' access to Director is easier than any except Directorate

Physics Advisory Committee



- Members:

  Alexander(Cornell, Chair), Brau(Oregon), Kahn(SLAC), Kondo(KEK), Lankford(UC, Irvine), Lykken(FNAL), Marlow(Princeton), Muruyama(U.C., Berkeley), Roe(LBL), Schellman(N.U.), Su Dong(SLAC), Tipton(Roch.), Virdee(Imp/CERN), Willenbrock(Ill.)

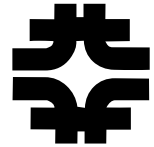
- Meetings
  - Late Fall, Spring, June (1 Week in Aspen)

- Charge
  - Experiment approval
  - Expanding astroparticle physics remit

- Reports to Director

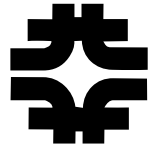
- Recommendations can lead to Evaluation Groups, for example the Martin/Michaels and Finley Committees and Reports on Proton need and capability.

Interaction with DOE



- Regular attendance at and participation in HEPAP meetings
- DOE OHEP invited to all PAC Meetings
- DOE OHEP invited to International Finance Meetings
- Interaction with OHEP at reviews
- Participation in regular phone meetings FNAL-DOE-OHEP/FAO
- DOE Fermi Area Office present at many meetings, plus informal meetings “on the floor” and “on the fly”
- Meetings of FAO Project Managers directly with Fermilab Project Managers

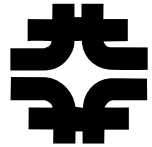
Interaction with agencies



- NSF
  - ~ monthly phone calls Director, Assoc. Director, NSF
  - Invited to PAC meetings
  - Invited to International Finance Committees

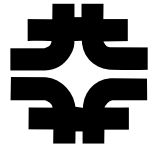
- Other Agencies
  - Many to Int. Fin. Com. Of CDF and D0
  - Have invited Italy and Russia to Director's Reviews of BTeV
  - Japan has special relation through US-Japan accord
  - Russia has special relation through US-Russia accord

Reviews



- Directors' Reviews
  - Informal, internal, eg. preparation for PAC
  - Quasi-formal, preparation and prerequisite for DOE Construction (Lehman) Reviews
- DOE Construction Reviews
  - Lehman
- Program Review, Operations Review, Office of Science Institutional Review (On-site Visit)
- URA Visiting Committee

Physics & Experimental Program



- Plenary Talks
  - Particle Physics Division --- John Cooper
  - Computing Division --- Vicky White
- Management Breakout (Tuesday 4pm)
  - Montgomery, Cooper, White
- PEP Breakout
  - 08:30 -- 12:00 PPD at CDF
  - Lunch at Feynman Computing Center
  - 12:45 – 2:15 CD at FCC